comparison is the scanning of <u>individual pixels</u> of the semiconductor wafer defining a <u>signature</u> <u>of each pixel</u>. In the present invention, a determination is made as to whether the pixel signature for an individual pixel has characteristics of a faultless or a defective pixel (page 11, lines 2-7). All of the claims refer to the detection of the <u>signature of each pixel</u>. This term is expressly defined as the area [of the wafer] covered by the spot of the beam <u>at the moment the sampling is</u> <u>carried out</u> (page 16, lines 19-22) and is not used in the traditional sense to mean an element of a display image. The term is expressly stated in the claims to mean "the way in which the pixel <u>alone</u> responds to the light of a scanning beam <u>without reference to adjacent pixels.</u>" (emphasis added)

The specification makes clear that a <u>pixel-based analysis</u> is distinguishable over a <u>pattern</u> <u>based analysis</u> as in the prior art.
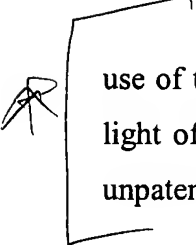
Alumot

The patent to Alumot teaches the inspection of a wafer using strings of pixels of images related to an inspected pattern and a reference pattern. The Examiner admits that Alumot fails to disclose the detection of a pixel alone and without reference to adjacent pixels, for the signature of the pixel. In particular, the function of the image comparator 77 is to carry out a comparison between the inspected image <u>in the vicinity</u> of a current pixel and the referenced image <u>in the</u> <u>vicinity</u> of the corresponding pixel. Clearly, this involves something more than a signature of the a single pixel. Specifically, this comparison is based on a 3x3 neighborhood matrix centered on a pixel of interest, as explained at col. 20, line 2. Thus, a single pixel is compared to the 9 pixels in the 3 x 3 neighborhood centered at the corresponding reference pixel. Each of 9 comparisons is made by the comparing the difference between energy of the compared pixels against a threshold determined by the pixel type. The energy of a pixel is the sum of the 9 pixels in the <u>3 x</u> <u>3 neighborhood at the pixel</u>. The phase 2 examination, which is disclosed beginning at col. 21, line 73 is similar.

Tsai et al

The Examiner looks to Tsai et al for a teaching of a "pixel-by-pixel" comparison for detecting defects on a wafer. The Examiner refers to the text at col. 3, lines 42-52 for support, as it states

Having now rotated the image into alignment with the camera, and having adjusted the magnification such that the pitch of the repeating pattern of the image cast upon the sensitive surface of the camera 20 is a predetermined integer number of pixels, it will be appreciated that insofar as the presently viewed image is concerned, process variation is no longer significant as similar features of the image can be directly compared on a pixel by pixel basis. More specifically, in order to perform an inspection of any feature of the pattern, the pixel or pixels containing the subject pattern are compared to any other pixel or group of pixels containing the same feature, and if there is a material variance between the two, then a defect has been detected.

The above quoted text does not teach that pixel signatures are determined without reference to other pixels. The only teaching is of a "pixel-by-pixel" comparison. There is no statement of the basis for that comparison. Given the age of the reference and the absence of any teaching as to pixel signature, the clear conclusion is that Tsai et al is practicing the conventional technique of determining the features of a pixel on the basis of other adjacent pixels. Even if one pixel's features may be compared to another pixel's features, those features are determined on the basis of adjacent pixels. Nothing suggests that the effect of other pixels should be avoided, and indeed, the clear impression of the teaching is that the field of view for the camera is a matrix or group of pixels.

In the absence of any teaching in either reference of the claim limitation that requires the use of the signature of each pixel, defined by the way in which the pixel alone responds to the light of a scanning beam without reference to adjacent pixels, the claim cannot be considered unpatentable.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

3

Amendment under 37 C.F.R. § 1.111
Application No. 10/003,347

The USPTO is directed and authorized to charge all required fees, except for the Issue

Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any
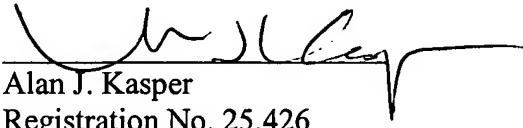
overpayments to said Deposit Account.

Respectfully submitted,

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Date: May 28, 2004